



US 20130186591A1

(19) **United States**
(12) **Patent Application Publication**
Jung et al.

(10) **Pub. No.: US 2013/0186591 A1**
(43) **Pub. Date: Jul. 25, 2013**

(54) **AIR CONDITIONER, AIR CONDITIONING SYSTEM HAVING THE SAME, AND METHOD FOR CONTROLLING OUTDOOR UNIT OF THE SYSTEM**

(52) **U.S. Cl.**
CPC *F28F 27/00* (2013.01)
USPC *165/11.1*

(71) Applicants: **Seunghwan Jung**, Seoul (KR); **Juntae Kim**, Seoul (KR)

(57) **ABSTRACT**

(72) Inventors: **Seunghwan Jung**, Seoul (KR); **Juntae Kim**, Seoul (KR)

According to the present disclosure, there are disclosed an air conditioner, an air conditioning system including the same, and an outdoor unit control method. According to the embodiments of the present disclosure, a user or the like may easily upgrade an outdoor unit program without directly visiting the site, and upgrade outdoor unit programs provided in a plurality of outdoor units, respectively at the same time. According to the embodiments of the present disclosure, it may be possible to detect an error occurred while remotely upgrading an outdoor unit program and retransmit or restore the outdoor unit program when the error has occurred. Accordingly, it may be possible to prevent a malfunction of the outdoor unit and air conditioner that can be occurred according to an upgrade failure of the outdoor unit program.

(21) Appl. No.: **13/647,608**

(22) Filed: **Oct. 9, 2012**

(30) **Foreign Application Priority Data**

Oct. 10, 2011 (KR) 10-2011-0103285

Publication Classification

(51) **Int. Cl.**
F28F 27/00 (2006.01)

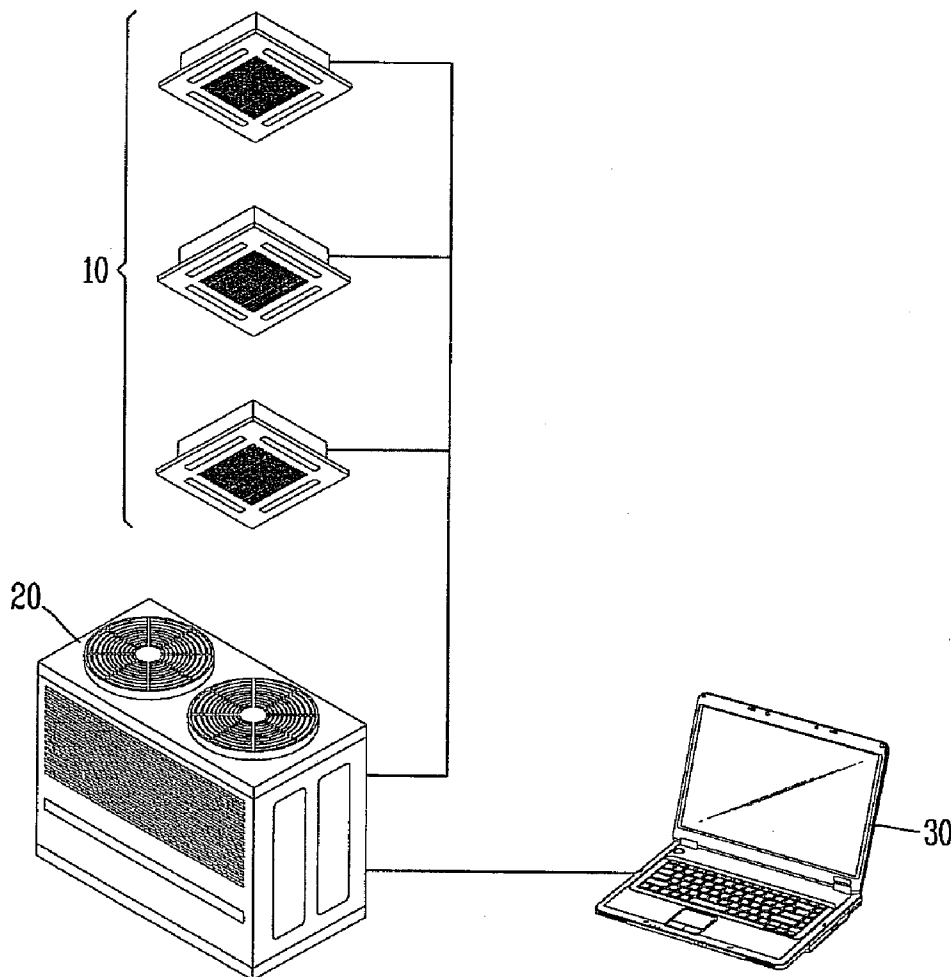


FIG. 1

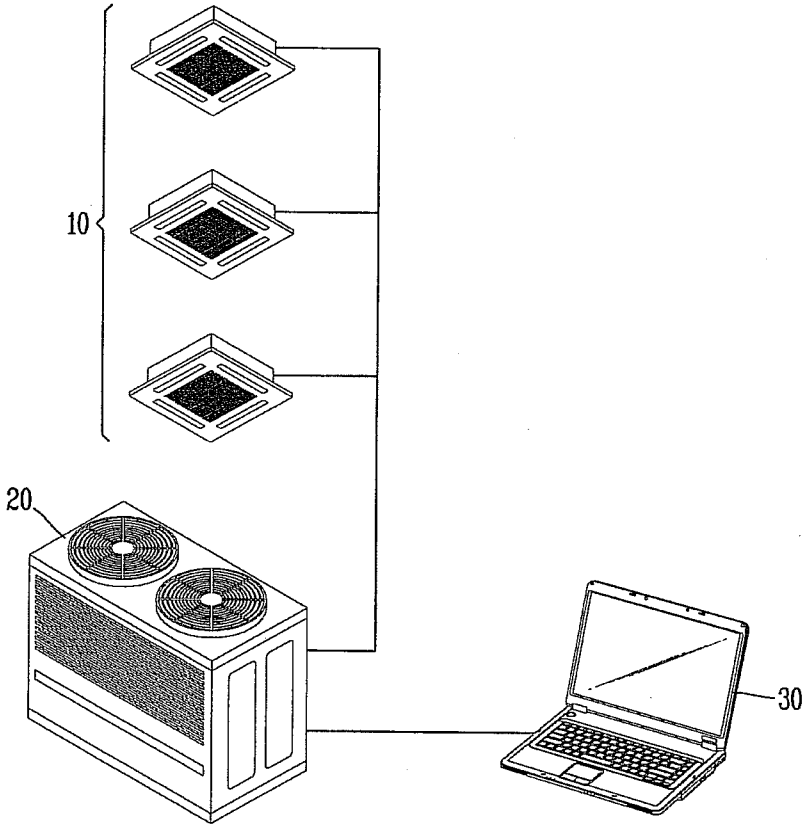


FIG. 2

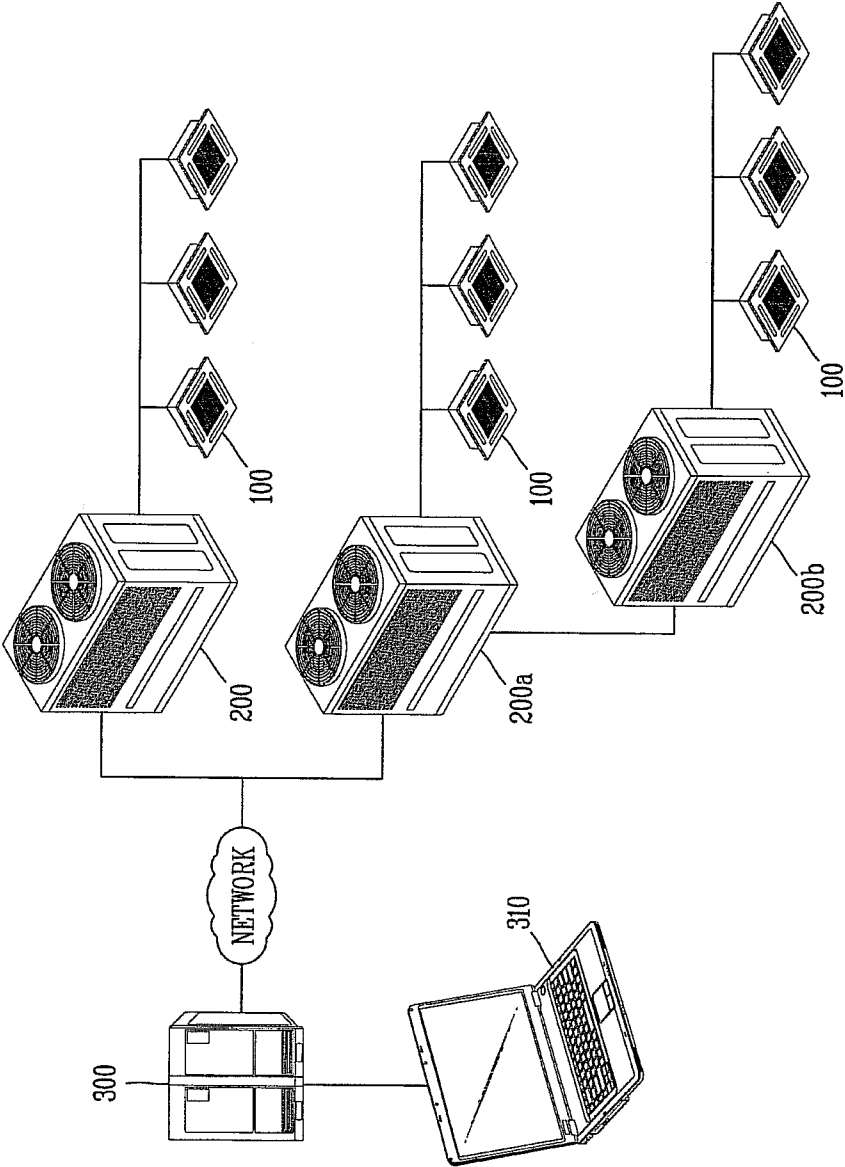


FIG. 3

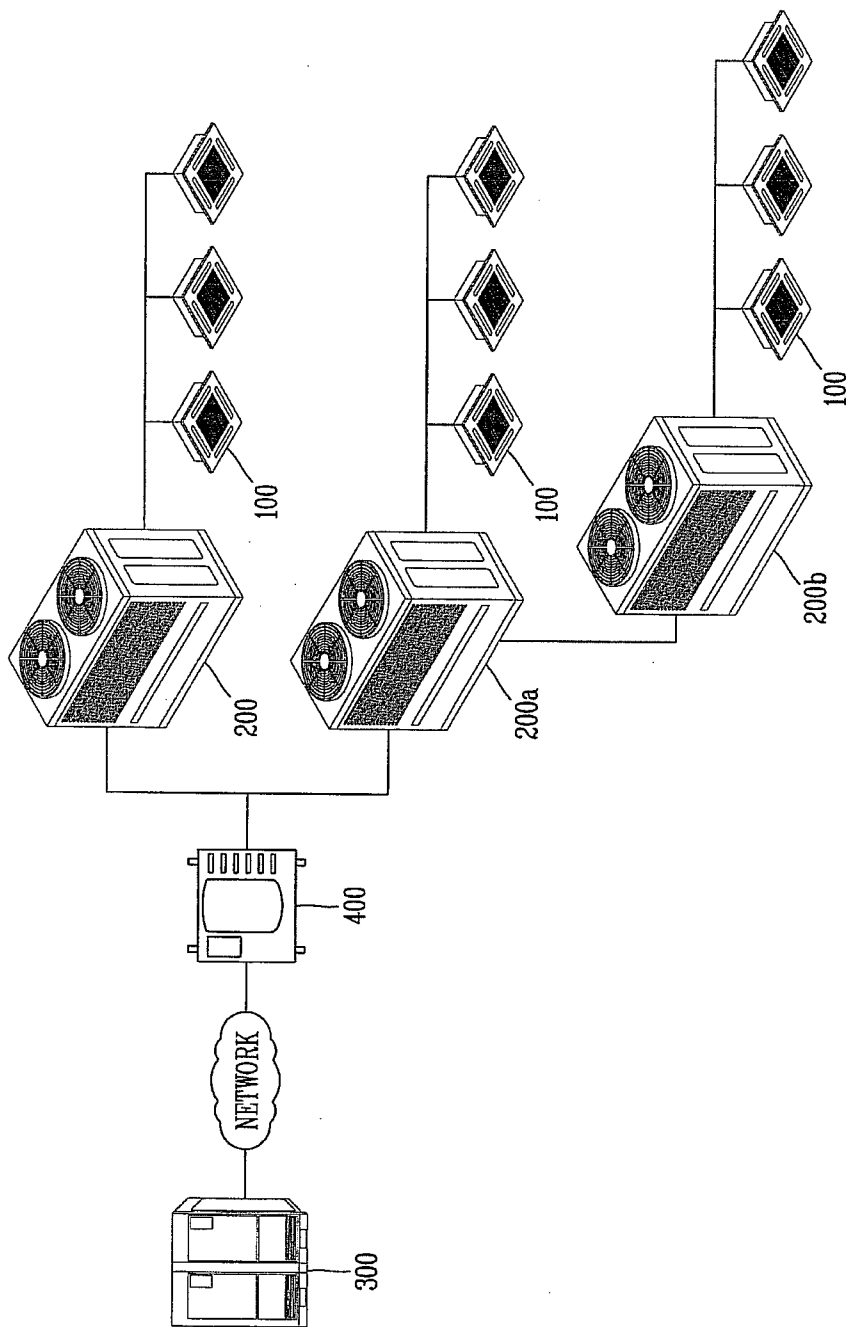


FIG. 4

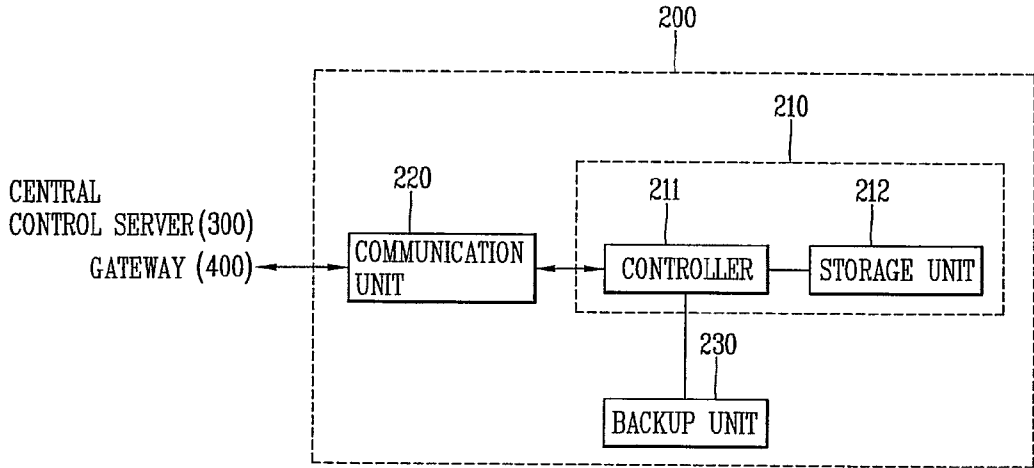


FIG. 5

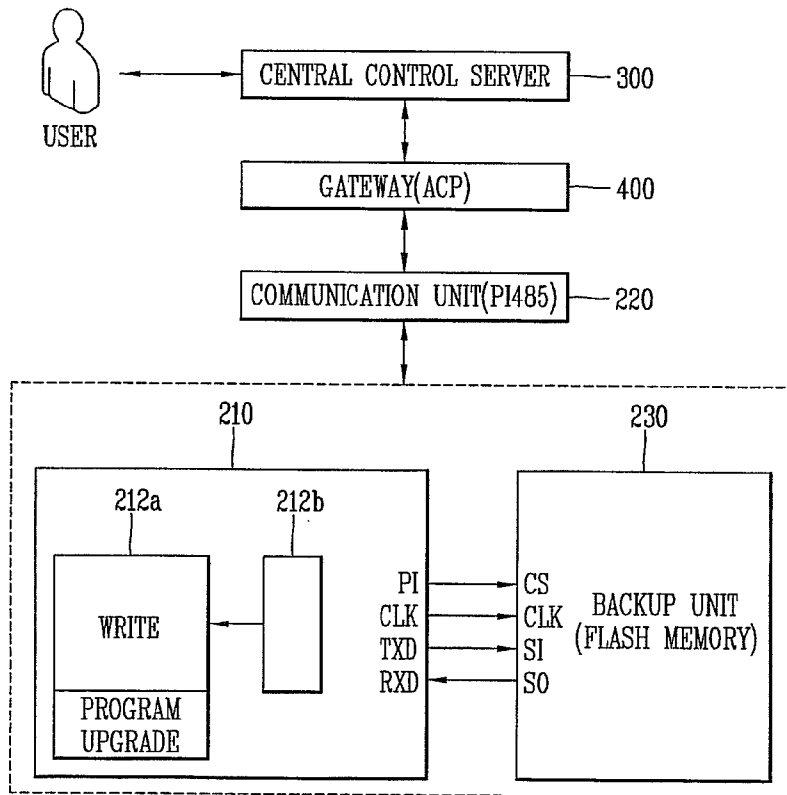


FIG. 6

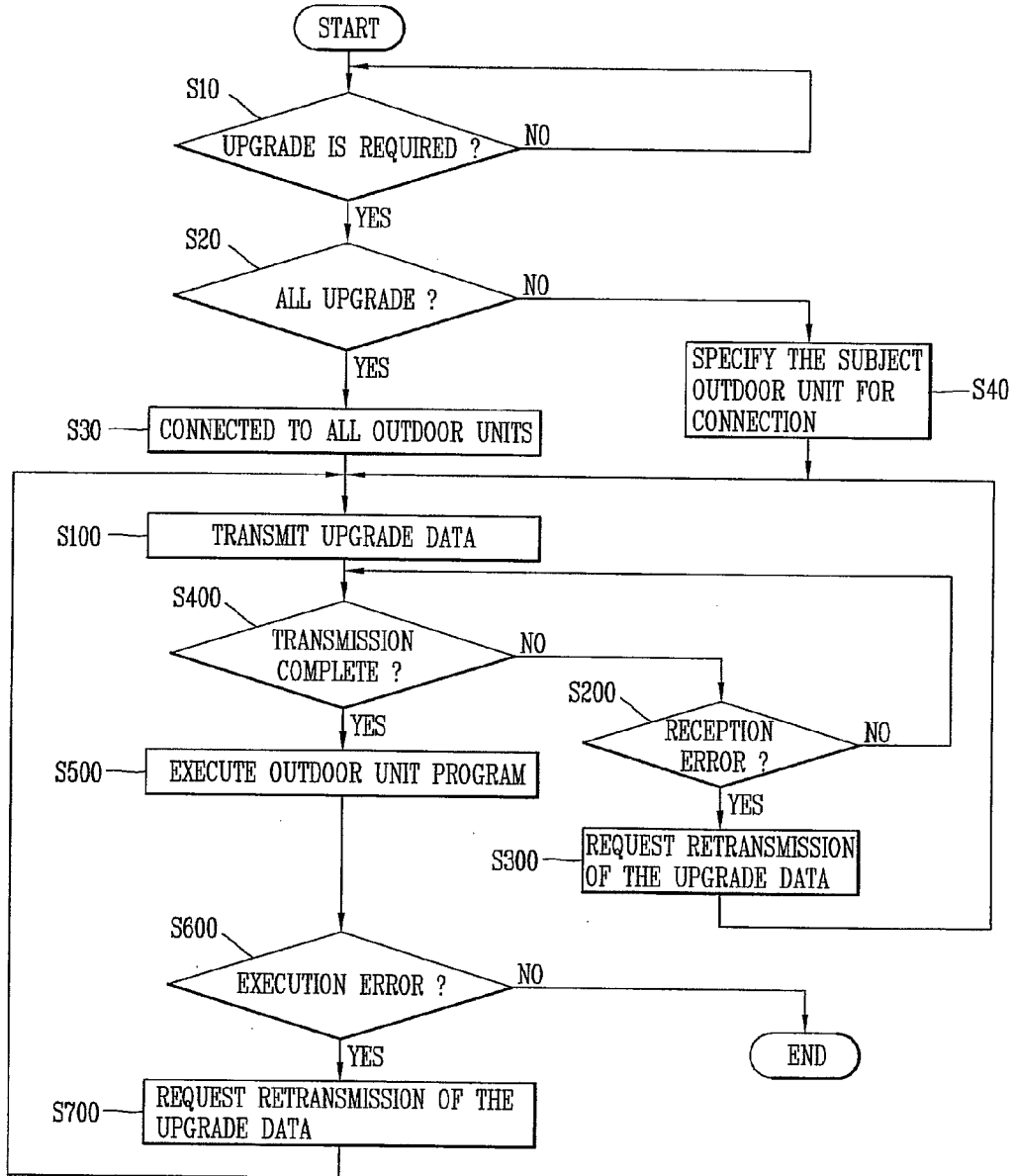
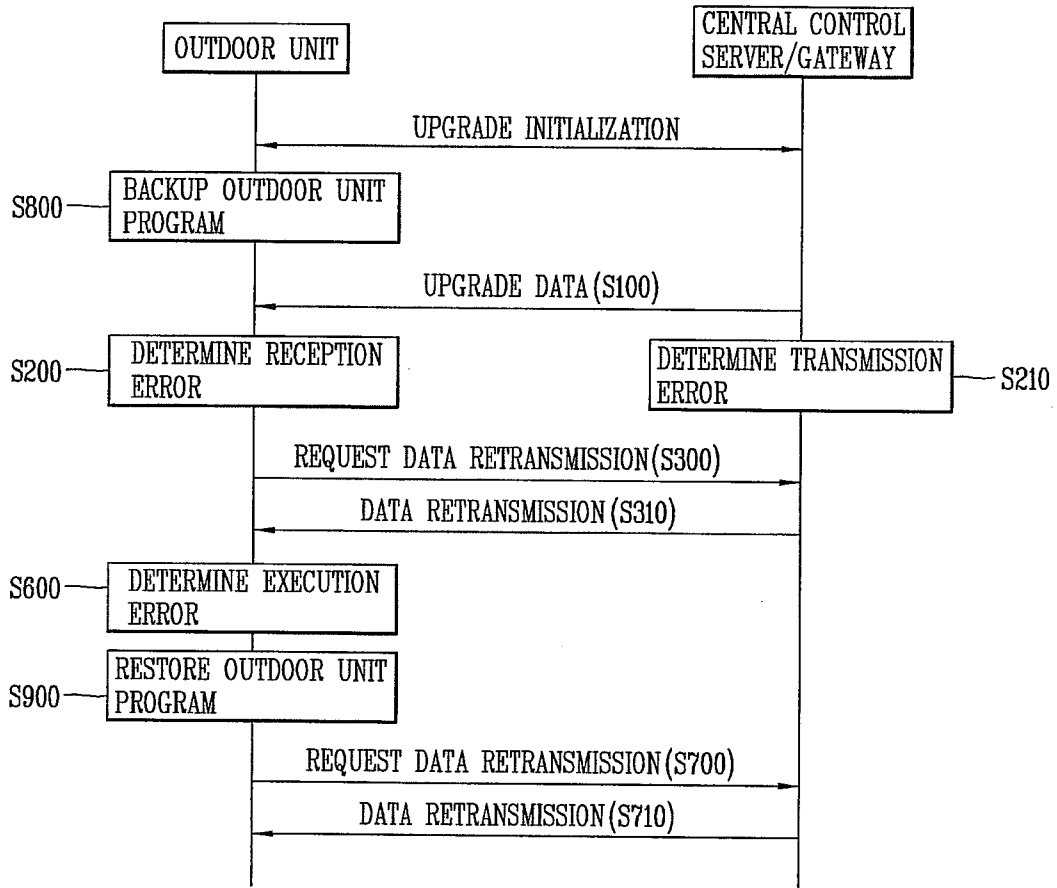


FIG. 7



AIR CONDITIONER, AIR CONDITIONING SYSTEM HAVING THE SAME, AND METHOD FOR CONTROLLING OUTDOOR UNIT OF THE SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] Pursuant to 35 U.S.C. §119(a), this application claims the benefit of earlier filing date and right of priority to Korean Application No. 10-2011-0103285 filed on Oct. 10, 2011, the contents of which are incorporated by reference herein in its entirety.

BACKGROUND OF THE DISCLOSURE

[0002] 1. Field of the Disclosure

[0003] The present disclosure relates to an air conditioner for remotely upgrading an outdoor unit program without visiting the site, and an air conditioning system including the same.

[0004] 2. Background of the Disclosure

[0005] In recent years, as building facilities are modernized, automatic control systems for automatically controlling sub-systems such as electric power, lighting, air conditioning, disaster prevention, crime prevention, and the like provided in a building have been expanded, and the development of a central monitoring system such a building management system (BMS) capable of integrating and managing such sub-systems as a whole has been actively carried out.

[0006] In general, an air conditioner has an indoor unit and an outdoor unit to perform cooling and heating cycles according to a user's request. At this time, the indoor unit and outdoor unit are connected through a refrigerant pipe. In recent years, an air conditioning system may be configured to include a plurality of multi air conditioners and a control device for controlling the plurality of multi air conditioners connected therebetween.

[0007] In recent years, an air conditioner is provided with an air conditioner controller or a gateway to enhance an efficiency of air conditioning management in public buildings such as a company, a school, or the like in which the air conditioner is provided. In other words, as the performance of an outdoor unit is improved, in recent years, there has been a tendency for the air conditioner that a large number of indoor units are commonly connected to the outdoor unit and a plurality of multi air conditioners are controlled in an integrated manner through the air conditioner controller. Furthermore, in recent years, an air conditioner is further provided with a remote central control server capable of remotely controlling multi air conditioners to control the multi air conditioners or monitor information on the status, operation and the like of the multi air conditioners through the remote control server.

[0008] In an air conditioner according to the related art, a dip switch is provided at a micom board of the outdoor unit to upgrade an outdoor unit program and execute the completely upgraded program. In other words, in the related art, the user or the like directly connects a communication line to the outdoor unit, and switches the mode using the dip switch, and then transmits an outdoor unit program to the outdoor unit to execute its upgrade, and then switches the mode using the dip switch again to execute the outdoor unit program. Further-

more, the user or the like resets the micom board subsequent to mode conversion such that the outdoor unit is operated in the switched mode.

[0009] Accordingly, as illustrated in FIG. 1, in order to upgrade an outdoor unit program of the outdoor unit provided at the site, there is a burden for the user or the like to directly visit the site to connect the outdoor unit and outdoor unit program with a prestored device.

SUMMARY OF THE DISCLOSURE

[0010] An aspect of the present disclosure is to provide an air conditioning system in which an outdoor unit program can be easily upgraded by remote control in an air conditioner including a plurality of indoor units and one or more outdoor units for driving them, and an outdoor unit control method thereof.

[0011] Another aspect of the present disclosure is to provide an air conditioner for detecting an error occurred while remotely upgrading an outdoor unit program, and retransmitting the outdoor unit program when the error has occurred, and an air conditioning system including the same.

[0012] Still another aspect of the present disclosure is to provide an air conditioner capable of restoring an outdoor unit program when an error has occurred while remotely upgrading an outdoor unit program, and an air conditioning system including the same.

[0013] An air conditioner according to an embodiment may include a plurality of indoor units configured to perform air conditioning, and one or more outdoor units connected to the plurality of indoor units to drive the indoor units, wherein the outdoor unit determines an error occurred while receiving an outdoor unit program for driving the indoor units and the outdoor unit, and requests retransmission of the outdoor unit program when the error has occurred.

[0014] An air conditioner according to another embodiment may include a plurality of indoor units configured to perform air conditioning, one or more outdoor units having an outdoor unit program connected to the plurality of indoor units to drive the indoor units, and a backup unit provided in or connected to the outdoor unit to back up the outdoor unit program, wherein the outdoor unit determines a reception error or execution error of the outdoor unit program or the upgrade data for the outdoor unit program, and restores the outdoor unit program using the outdoor unit program that has been backed up in the backup unit when the reception error or execution error has occurred.

[0015] An air conditioning system according to an embodiment may include an air conditioner including a plurality of indoor units, a plurality of outdoor units configured to drive the plurality of indoor units using an outdoor unit program, and a backup unit provided in or connected to the outdoor unit to back up the outdoor unit program so as to perform air conditioning, and a central control server configured to form a communication network with the air conditioner, and transmit upgrade data for the outdoor unit program to part or all of the plurality of outdoor units to upgrade the outdoor unit program.

[0016] In an air conditioning system including an air conditioner comprising a plurality of indoor units and a plurality of outdoor units configured to drive the indoor units using an outdoor unit program, and a central control server configured to form a communication network with the air conditioner, and control the plurality of outdoor units or upgrade the outdoor unit program, an outdoor unit control method of the

air conditioning system according to an embodiment may include allowing the central control server to transmit upgrade data for the outdoor unit program to the outdoor units, allowing the outdoor units to sense a reception error of the upgrade data, and allowing the outdoor units to request retransmission of the upgrade data to the central control server when a reception error of the upgrade data has occurred.

[0017] According to the embodiments of the present disclosure, a user or the like can easily upgrade an outdoor unit program without directly visiting the site. Furthermore, according to the embodiments of the present disclosure, outdoor unit programs provided in a plurality of outdoor units, respectively, can be upgraded at the same time.

[0018] According to the embodiments of the present disclosure, it may be possible to detect an error occurred while remotely upgrading an outdoor unit program and retransmit or restore the outdoor unit program when the error has occurred.

[0019] According to the embodiments of the present disclosure, it may be possible to prevent a malfunction of the outdoor unit and air conditioner that can be occurred according to an upgrade failure of the outdoor unit program, thereby improving the stability of the system. Furthermore, according to the embodiments of the present disclosure, it may be possible to reduce time required to upgrade the outdoor unit program, decrease the cost, and improve the user's convenience.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The accompanying drawings, which are included to provide a further understanding of the disclosure and are incorporated in and constitute a part of this specification, illustrate embodiments of the disclosure and together with the description serve to explain the principles of the disclosure.

[0021] In the drawings:

[0022] FIG. 1 is a view for explaining the operation of upgrading an outdoor unit program according to the related art;

[0023] FIGS. 2 and 3 are views schematically illustrating the configuration of an air conditioning system according to the embodiments of the present disclosure;

[0024] FIG. 4 is a block diagram illustrating the detailed configuration of an outdoor unit in an air conditioner according to an embodiment;

[0025] FIG. 5 is a view illustrating the detailed configuration of an outdoor unit and its connection relation to another device in an air conditioner according to another embodiment; and

[0026] FIGS. 6 and 7 are flow charts schematically illustrating a method of controlling an outdoor unit in an air conditioning system according to the embodiments of the present disclosure.

DETAILED DESCRIPTION OF THE DISCLOSURE

[0027] Referring to FIG. 2, an air conditioning system according to an embodiment may include an air conditioner including a plurality of indoor units 100, and a plurality of outdoor units 200 configured to drive the plurality of indoor units using an outdoor unit program so as to perform air conditioning, and a central control server 300 configured to form a communication network with the air conditioner, and

transmit upgrade data for the outdoor unit program to part or all of the plurality of outdoor units to upgrade the outdoor unit program.

[0028] The outdoor unit 200 may be configured with one outdoor unit or configured with two or more outdoor units 200a, 200b connected therebetween. At this time, one or two or more indoor units are connected to each outdoor unit.

[0029] Referring to FIG. 3, an air conditioning system according to another embodiment may further include a gateway 400 provided between the central control server and the air conditioner such that the central control server directly upgrades the outdoor unit program or configured to receive the upgrade data from the central control server to upgrade the outdoor unit program.

[0030] The gateway is connected to each outdoor unit through a dedicated line communication method such as RS-485, or a local area network (LAN) and the like to transmit and receive data. The gateway 400 is connected to the central control server 300 through a network such as an Internet network to receive an outdoor unit program for outdoor units and indoor units, and receive upgrade data for upgrading the outdoor unit program. Referring to FIG. 2 or 3, in case of an air conditioner configured with a plurality of outdoor units, it may be configured such that one of the outdoor units is operated as a master outdoor unit 200a, and the remaining outdoor units are operated as slave outdoor units 200b. In other words, the plurality of outdoor units 200 may be configured with one or more master outdoor units 200a connected to the gateway through a dedicated line to be upgraded or controlled, and one or more slave outdoor units 200b connected to the master outdoor unit to receive the upgrade data from the master outdoor unit to upgrade the outdoor unit program built therein.

[0031] Referring to FIG. 2 or 3, an air conditioner according to an embodiment may include a plurality of indoor units 100 configured to perform air conditioning, and one or more outdoor units 200 connected to the plurality of indoor units to drive the indoor units, and the outdoor unit 200 determines an error occurred while receiving an outdoor unit program for driving the indoor units and the outdoor unit, and requests retransmission of the outdoor unit program when the error has occurred.

[0032] Referring to FIG. 4, the outdoor unit 200 may include a control unit for driving outdoor units and indoor units using an outdoor unit program. The control unit 210 may include a storage unit 212 configured to store the outdoor unit program and upgrade data for the outdoor unit program, and a controller 211 configured to determine a reception error of the outdoor unit program or the upgrade data to drive the indoor units using the outdoor unit program.

[0033] The storage unit 212 may store the outdoor unit program and upgrade data. The storage unit 212 can be divided into a region 212a for storing the outdoor unit program or upgrade data and a region for receiving data from other devices as illustrated in FIG. 5 (for example, a backup unit, a communication unit, a controller, etc.) Here, the region 212a may be configured with ROM, and the region 212b may be configured with RAM.

[0034] When the central control server 300 controls the outdoor unit 200, the central control server 300 specifies the outdoor unit and then transmits control data to control the relevant outdoor unit. Furthermore, when the central control server 300 upgrades an outdoor unit program provided in the outdoor units, the central control server 300 may transmit

upgrade data to all the outdoor units or selectively specify outdoor units to transmit upgrade data to the specified outdoor units. The central control server 300 may transmit upgrade data to all the retrieved outdoor units or the specified outdoor units at the same time.

[0035] Furthermore, the upgrade of the outdoor unit program may be also carried out by the gateway 400. The gateway 400 may be connected to the central control server 300 through the Internet, BACnet, LonWorks network or the like to receive upgrade data from the central control server, and transfer data to all or part of the outdoor units subject to upgrade, connected to the gateway 400 or retrieved by the gateway 400.

[0036] Referring to FIG. 4 again, the air conditioner may further include a communication unit 220 provided in or connected to the outdoor unit to receive the outdoor unit program or the upgrade data to transmit it to the outdoor unit, and transmit a request signal for requesting retransmission of the outdoor unit program or the upgrade data.

[0037] The communication unit 220 performs communication with the gateway 400 using a communication method such as dedicated line communication, plumbing communication, power line communication, and the like, or directly connected to the central control server 300 to perform communication. The communication unit 220 receives a control command, and receives an upgrade command for upgrading the outdoor unit program, and receives upgrade data to transfer it to the outdoor unit. The communication unit 220 may be configured with PI485 as illustrated in FIG. 5 to perform RS-485 dedicated line communication and transmit and receive data.

[0038] The controller 211 drives the outdoor unit itself using the outdoor unit program and drives the indoor units connected to the outdoor unit. The controller 211 performs a control command received from the central control server 300 or the like. When the central control server 300 specifies an outdoor unit using a method such as an addressing scheme to transmit a control command, the controller 211 compares its own preset address with an address contained in the control command. When the address contained in the control command is identical to its own address, the controller 211 performs the control command.

[0039] The controller 211 performs an upgrade command transmitted from the central control server or gateway. The controller 211 may perform upgrade when the upgrade commands are collectively transmitted to all without specifying the address, but may perform upgrade if the address is identical thereto when the upgrade command is transmitted subsequent to specifying the address.

[0040] The controller 211 determines an error occurred while receiving an outdoor unit program or upgrade data for the outdoor unit program. As a result of the determination, when an error has occurred, the controller 211 requests retransmission of the outdoor unit program or upgrade data. At this time, the communication unit 220 transmits a request signal for requesting retransmission of the outdoor unit program or upgrade data to the central control server or gateway. An algorithm for checking a data error such as cyclic redundancy check (CRC), checksum or the like may be used to determine an error of the upgrade command or upgrade data. Furthermore, the communication protocol, data format and the like for transmitting and receiving data are widely known and thus the description thereof will be omitted.

[0041] When an upgrade command is received or upgrade data are all received, the controller 211 may generate a response signal to this. At this time, when it is unable to receive a response signal, the gateway 400 or central control server 300 may determine that there is an error in the upgrade command or upgrade data and retransmit the upgrade command.

[0042] The air conditioner may further include a backup unit 230 provided in or connected to the outdoor unit to back up the outdoor unit program. At this time, when a reception error or execution error of the outdoor unit program or upgrade data has occurred, the control unit 210 restores it using the outdoor unit program that has been backed up in the backup unit.

[0043] Referring to FIGS. 2 through 4 again, an air conditioner according to another embodiment may include a plurality of indoor units 100 configured to perform air conditioning, one or more outdoor units 200 having an outdoor unit program, connected to the plurality of indoor units, to drive the indoor units, and a backup unit 230 provided in or connected to the outdoor unit to back up the outdoor unit program. Here, the outdoor unit 200 determines a reception error or execution error of the outdoor unit program or upgrade data for the outdoor unit program, and when the reception error or execution error has occurred, the outdoor unit program is restored to an outdoor unit program that has been backed up in the backup unit 230.

[0044] The backup unit 230 may be provided within the outdoor unit, as an example. A partial area of the storage unit 212 may be assigned to a backup area of the backup unit 230.

[0045] For another example, the backup unit 230 may be connected to the outdoor unit 200. In this case, the backup unit 230 may be detachably connected to the outdoor unit 200. Furthermore, the backup unit 230 may have a form such as a flash memory. The backup unit 230 copies and stores the outdoor unit program. The backup unit 230 and the control unit 210 of the outdoor unit may perform serial peripheral interface (SPI) bus communication, for example, as illustrated in FIG. 5. Here, when an error has occurred while receiving upgrade data or executing the outdoor unit program, the controller 211 restores it to an outdoor unit program backed up by the backup unit 230.

[0046] For another example, the air conditioner may use the memory of the central control server or gateway as the backup unit 230. In other words, the gateway 400 or central control server 300 may store an outdoor unit program. At this time, when an error has occurred while receiving the upgrade data or executing the outdoor unit program, the control unit 210 transmits an error generation signal to the gateway 400 or central control server 300 through the communication unit 220. Upon receiving the error generation signal, the gateway 400 or central control server 300 retransmits upgrade data or transmits an outdoor unit program that has been backed up and stored in advance.

[0047] Referring to FIG. 6, in an air conditioning system including an air conditioner including a plurality of indoor units and a plurality of outdoor units configured to drive the indoor units using an outdoor unit program, and a central control server configured to form a communication network with the air conditioner, and control the plurality of outdoor units or upgrade the outdoor unit program, an outdoor unit control method of the air conditioning system according to an embodiment may include allowing the central control server to transmit upgrade data for the outdoor unit program to the

outdoor units (S100), allowing the outdoor units to sense a reception error of the upgrade data (S200), and allowing the outdoor units to request retransmission of the upgrade data to the central control server when a reception error of the upgrade data has occurred (S300).

[0048] When the central control server controls the outdoor unit, the central control server specifies an outdoor unit, and then transmits control data to control the relevant outdoor unit. Furthermore, the central control server upgrades an outdoor unit program provided in the outdoor units, the upgrade data may be transmitted to all the outdoor units, or transmitted to selectively specified outdoor units (S100). The central control server may transmit upgrade data to all the retrieved outdoor units or specified outdoor units at the same time.

[0049] In the air conditioning system further including a gateway provided between the air conditioner and the central control server to upgrade the outdoor unit program using the upgrade data, an outdoor unit control method of the air conditioning system according to another embodiment may include allowing the gateway to receive upgrade data for the outdoor unit program from the central control server, allowing the gateway to transmit the upgrade data to the outdoor units (S100), allowing the outdoor units to sense a reception error of the upgrade data (S200), and allowing the outdoor units to request retransmission of the upgrade data to the gateway when a reception error of the upgrade data has occurred (S300). Hereinafter, the configuration of the device will be described with reference to FIGS. 2 through 5.

[0050] The upgrade of the outdoor unit program may be also carried out by the gateway. The gateway may be connected to the central control server through the Internet, BACnet, LonWorks network or the like to receive upgrade data from the central control server, and transfer data to all or part of the outdoor units subject to upgrade, connected to the gateway or retrieved by the gateway (S100).

[0051] The outdoor unit is driven by using an outdoor unit program, or drives indoor units connected to the outdoor unit. The outdoor unit performs a control command received from the central control server or the like. When the central control server specifies an outdoor unit using a method such as an addressing scheme to transmit a control command, the relevant outdoor unit compares its own preset address with an address contained in the control command, and when the address contained in the control command is identical to its own address, the outdoor unit performs the control command. The outdoor unit performs an upgrade command transmitted from the central control server or gateway. The outdoor unit may perform upgrade when the upgrade commands are collectively transmitted to all without specifying the address, but may perform upgrade if the address is identical thereto when the upgrade command is transmitted subsequent to specifying the address.

[0052] The outdoor unit determines an error occurred while receiving an outdoor unit program or upgrade data for the outdoor unit program (S200). As a result of the determination, when an error has occurred, the outdoor unit requests retransmission of the outdoor unit program or upgrade data (S300). An algorithm for checking a data error such as cyclic redundancy check (CRC), checksum or the like may be used to determine an error of the upgrade command or upgrade data. Whether or not the transmission of upgrade data is completed may be determined by transmitting preset data to each outdoor unit and then analyzing its response signal.

[0053] Referring to FIG. 7, an outdoor unit control method according to embodiments may further include allowing the air conditioner to back up the outdoor unit program (S800). Furthermore, the outdoor unit control method may further include allowing the outdoor units to restore the outdoor unit program using the backed up outdoor unit program when a reception error of the upgrade data has occurred (S900).

[0054] Furthermore, the outdoor unit control method may further include allowing the outdoor units to execute an upgraded outdoor unit program (S500), and allowing the outdoor units to determine whether or not an execution error has occurred (S600). Referring to FIG. 6, the outdoor unit control method may further include allowing the outdoor units to request retransmission of the upgrade data when the execution error has occurred as a result of the determination (S700). On the other hand, referring to FIG. 7, the outdoor unit control method may further include allowing the outdoor units to restore the outdoor unit program using the backed up outdoor unit program when the execution error has occurred as a result of the determination (S900).

[0055] The outdoor unit program may be stored in a partial area of the memory within the outdoor unit. Furthermore, the outdoor unit program may be backed up in an external memory, such as a flash memory, connected to the outdoor unit. The outdoor unit restores it to the backed up outdoor unit program when an error has occurred while receiving the upgrade data or executing the outdoor unit program (S900).

[0056] For another example, the air conditioner may back up an outdoor unit program in the memory of the central control server or gateway. In other words, the gateway 400 or central control server 300 may store an outdoor unit program. At this time, when an error has occurred while receiving upgrade data or executing the outdoor unit program, the outdoor unit transmits an error generation signal to the gateway or central control server. Upon receiving the error generation signal, the gateway or central control server may retransmit upgrade data or transmit an outdoor unit program that has been backed up and stored in advance.

[0057] As described above, according to an air conditioner, an air conditioning system including the same, and an outdoor unit control method in accordance with the embodiments of the present disclosure, a user or the like may easily upgrade an outdoor unit program without directly visiting the site, and upgrade outdoor unit programs provided in a plurality of outdoor units, respectively at the same time. According to the embodiments of the present disclosure, it may be possible to detect an error occurred while remotely upgrading an outdoor unit program and retransmit or restore the outdoor unit program when the error has occurred. Accordingly, it may be possible to prevent a malfunction of the outdoor unit and air conditioner that can be occurred according to an upgrade failure of the outdoor unit program.

What is claimed is:

1. An air conditioner, comprising:
 - a plurality of indoor units configured to perform air conditioning; and
 - one or more outdoor units connected to the plurality of indoor units to drive the indoor units,
 wherein the outdoor unit determines an error occurred while receiving an outdoor unit program for driving the indoor units and the outdoor unit, and requests retransmission of the outdoor unit program when the error has occurred.

2. The air conditioner of claim 1, wherein the outdoor unit comprises:

a control unit having a storage unit configured to store the outdoor unit program and upgrade data for the outdoor unit program, and

a controller configured to determine a reception error of the outdoor unit program or the upgrade data to drive the indoor units using the outdoor unit program.

3. The air conditioner of claim 2, further comprising:

a communication unit provided in or connected to the outdoor unit to receive the outdoor unit program or the upgrade data to transmit it to the outdoor unit, and transfer a request signal for requesting retransmission of the outdoor unit program or the upgrade data.

4. The air conditioner of claim 1, further comprising:

a backup unit provided in or connected to the outdoor unit to back up the outdoor unit program.

5. The air conditioner of claim 4, wherein when a reception error or execution error of the outdoor unit program or the upgrade data has occurred, the outdoor unit restores the outdoor unit program using an outdoor unit program that has been backed up in the backup unit.

6. An air conditioning system, comprising:

an air conditioner comprising a plurality of indoor units, a plurality of outdoor units configured to drive the plurality of indoor units using an outdoor unit program, and a backup unit provided in or connected to the outdoor unit to back up the outdoor unit program so as to perform air conditioning; and

a central control server configured to form a communication network with the air conditioner, and transmit upgrade data for the outdoor unit program to part or all of the plurality of outdoor units to upgrade the outdoor unit program.

7. The air conditioning system of claim 6, wherein the outdoor unit comprises:

a storage unit configured to store the outdoor unit program or the upgrade data; and

a control unit comprising a controller configured to determine a reception error of the upgrade data, and upgrade the outdoor unit program using the received upgrade data.

8. The air conditioning system of claim 7, wherein the air conditioner further comprises:

a communication unit provided in or connected to the outdoor unit to receive the upgrade data to transmit it to the outdoor unit, and transmit a request signal for requesting retransmission of the upgrade data.

9. The air conditioning system of claim 6, wherein the central control server determines a transmission error of the outdoor unit program or the upgrade data to the outdoor unit, and retransmits the outdoor unit program or the upgrade data when the transmission error has occurred.

10. The air conditioning system of claim 6, further comprising:

a gateway provided between the central control server and the air conditioner such that the central control server directly upgrades the outdoor unit program or configured to receive the upgrade data from the central control server to upgrade the outdoor unit program.

11. The air conditioning system of claim 10, wherein the plurality of outdoor units comprises:

one or more master outdoor units connected to the gateway through a dedicated line to be upgraded or controlled; and

one or more slave outdoor units connected to the master outdoor unit to receive the upgrade data from the master outdoor unit to upgrade an outdoor unit program built therein.

12. The air conditioning system of claim 11, wherein the outdoor unit comprises:

a storage unit configured to store the outdoor unit program or the upgrade data; and

a control unit comprising a controller configured to determine a reception error of the upgrade data, and upgrade the outdoor unit program using the received upgrade data.

13. The air conditioning system of claim 12, wherein the air conditioner further comprises:

a communication unit provided in or connected to the outdoor unit to receive the upgrade data to transmit it to the outdoor unit, and transmit a request signal for requesting retransmission of the upgrade data.

14. The air conditioning system of claim 10, wherein the central control server determines a transmission error of the outdoor unit program or the upgrade data to the outdoor unit, and retransmits the outdoor unit program or the upgrade data when the transmission error has occurred.

15. An outdoor unit control method of an air conditioning system comprising an air conditioner comprising a plurality of indoor units and a plurality of outdoor units configured to drive the indoor units using an outdoor unit program, and a central control server configured to form a communication network with the air conditioner, and control the plurality of outdoor units or upgrade the outdoor unit program, the method comprising:

allowing the central control server to transmit upgrade data for the outdoor unit program to the outdoor units;

allowing the outdoor units to sense a reception error of the upgrade data; and

allowing the outdoor units to request retransmission of the upgrade data to the central control server when a reception error of the upgrade data has occurred.

16. The method of claim 15, further comprising:

allowing the air conditioner to back up the outdoor unit program.

17. The method of claim 16, further comprising:

allowing the outdoor units to restore the outdoor unit program using the backed up outdoor unit program when a reception error of the upgrade data has occurred.

18. The method of claim 16, further comprising:

allowing the outdoor units to execute an upgraded outdoor unit program;

allowing the outdoor units to determine whether or not an execution error has occurred; and

allowing the outdoor units to restore the outdoor unit program using the backed up outdoor unit program when the execution error has occurred as a result of the determination.

19. The method of claim 15, further comprising:

allowing the central control server to determine whether or not a transmission error of the upgrade data has occurred; and

allowing the central control server to retransmit the upgrade data when the transmission error has occurred as a result of the determination.

20. The method of claim 15, wherein the air conditioning system further comprises a gateway provided between the air conditioner and the central control server to upgrade the outdoor unit program using the upgrade data, and the method comprises:

- allowing the gateway to receive upgrade data for the outdoor unit program from the central control server;
- allowing the gateway to transmit the upgrade data to the outdoor units;
- allowing the outdoor units to sense a reception error of the upgrade data; and
- allowing the outdoor units to request retransmission of the upgrade data to the gateway when a reception error of the upgrade data has occurred.

* * * * *